RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER
QUARTERLY PROGRESS REPORT

Wisconsin Department of Transportation
DT1241 02/2011

INSTRUCTIONS:
Research project investigators and/or project managers should complete a quarterly progress report (QPR) for each calendar quarter during which the projects are active.

WisDOT research program category: ☐ Policy research ☒ Wisconsin Highway Research Program ☐ Other ☐ Pooled fund TPF#		Report period year: 2013 ☐ Quarter 1 (Jan 1 – Mar 31) ☐ Quarter 2 (Apr 1 – Jun 30) ☐ Quarter 3 (Jul 1 – Sep 30) ☒ Quarter 4 (Oct 1 – Dec 31)
Project title: Critical Factors Affecting Asphalt Concrete Durability		
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WisDOT project ID: 0092-14-06	Other project ID:	Project start date: 9/18/2013
Original end date: 3/17/2015	Current end date: 3/17/2015	Number of extensions: 0

Project schedule status:
☒ On schedule ☐ On revised schedule ☐ Ahead of schedule ☐ Behind schedule

Project budget status:

Total Project Budget	Expenditures Current Quarter	Total Expenditures	% Funds Expended	% Work Completed
$175,000.00	$3,673.85	$3,673.85	2%	2%

Project description:

The objective of this project is to develop recommended revisions to WisDOT specifications and guidance documents to improve the durability of asphalt concrete mixtures. The project will focus on changes to the composition of asphalt mixtures that WisDOT should consider to improve durability. The recommendations will be based on promising findings from completed research addressing asphalt concrete durability and the results of a laboratory study formulated specifically to evaluate the effectiveness of these promising findings for Wisconsin materials and environmental conditions. The project includes six tasks:

1. **Synthesis of Current Research.** Research on the durability of asphalt mixtures completed since NCHRP Projects 9-25 and 9-31 will be reviewed to identify recommendations for improving mixture durability.
2. **Work Plan Development.** Appropriate laboratory experiments will be designed based on the findings of Task 1.
3. **Interim Presentation and Project Memorandum.** The findings of Task 1 and the work plan developled in Task 2 will be presented to the Technical Advisory Committee (TAC).
4. **Execution of Work Plan and Analysis of Results.** The experiments in the work plan approved by the TAC will conducted and the results analyzed.
5. **Project Deliverables.** A report documenting the project and making recommendations concering changes to WisDOT specifications to improve durability will be prepared.
6. **Final Report and Project Closeout Activities.** The report and recommendations will be presented to the TAC and the report will be revised based on comments from the TAC.

Progress this quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Task 1. Synthesis of Current Research. Much of the work on this task was initiated this quarter. A search through the Transportation Research Board TRIAD database using the terms "asphalt durability"; "asphalt concrete durability"; and "asphalt mixture durability" returned 92 entries. All of these abstracts were reviewed. It is interesting that in spite of the high recent interest in improving durability, recent research has provided only one innovative recommendations for improving durability. Research at the National Center for Asphalt Technology recommended that the amount of virgin asphalt in mixture with recycled binder be increased by 0.1 percent for every 10 percent of RAP binder in the mixture. Based on this review, the promising approaches to improving durability that are related to mixture composition are:

1. Increase binder content. A number of approaches have been recommended for increasing the binder content of mixtures. These include: increasing VMA criteria, decreasing design air voids, decreasing design gyration level, and using smaller nominal maximum aggregate size mixtures.
2. Decrease permeability. Research has shown that permeability is a function of nominal nominal maximum aggregate size, in-place density, and the fineness of the gradation.
3. Use modified binders. A field study completed by the Asphalt Insittute concluded that pavements produced with modified binder have shown improved rutting and cracking performance.
4. Treat mixtures with recycled binder differently. Recommendations include limiting recycled binder content or type of recycled binde used, adjusting the grade of the virgin binder in the mixture, and increasing the binder content above the design based on the amount of recycled binder in the mixture.

These approaches will be considered in the formulation of the work plan in Task 2.

Task 2. Work Plan Development. Work was initiated near the end of the quarter on the development of the work plan. Reasonable models based on composition are avaialbe to evaluate the effect of many of the recommendations listed above on expected performance. An area that has not received adequate investigation is the effect of composition on age hardening. The laboratory work plan is being developed to evalute the effect of the recommendations listed above on age hardeing.

Task 3. Interim Presentation and Project Memorandum. No work has been performed on this task.

Task 4. Execution of Work Plan and Analysis of Results. No work has been performed on this task.

Task 5. Project Deliverables. No work has been performed on this task.

Task 6. Final Report and Project Closeout Activities. No work has been performed on this task.

Anticipated work next quarter:

Task 1. Synthesis of Current Research. This task will be completed next quarter. The findings will be summarized in the project memorandum that will be prepared in Task 3.

Task 2. Work Plan Development. This task will be completed next quarter. The work plan will be included in the project memorandum that will be prepared in Task 3.

Task 3. Interim Presentation and Project Memorandum. This task will be completed next quarter. When the project memorandum is submitted for TAC review, the interim presentation will be scheduled.

Task 4. Execution of Work Plan and Analysis of Results. No work is planned for this task.

Task 5. Project Deliverables. No work is planned for this task.

Task 6. Final Report and Project Closeout Activities. No work is planned for this task.

Circumstances affecting project or budget:

None.

Attach / insert Gantt chart and other project documentation

Task/Activity	2013							2014							2015						
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Task 1. Synthesis of Current Research.	P	P	P																		
	A	A	A																		
Task 2. Work Plan Development.		P	P																		
			A																		
Task 3. Interim Presentation and Project Memorandum.				P																	
Task 4. Execution of Work Plan and Analysis of Results.					P	P	P	P	P	P	P	P	P	P	P	P					
Task 5. Project Deliverables.															P	P	P	P			
Task 6. Final Report and Project Closeout Activities.																			P	P	P
Presentations				P																	
Quarterly Reports				P			P			P			P			P			P		
Project Memorandum				P																	
Draft Final Report																					
																			P		
Revised Final Report																					
																					P

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Staff receiving QPR: K. Dinkins	Date received: 1/5/14
Staff approving QPR:	Date approved: